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Adding Small Differences Can Increase Similarity and Choice

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Abstract

Similarity plays a critical role in many judgments and choices. Traditional models of similarity posit that increasing the number of differences between objects cannot increase judged similarity between them. In contrast to these previous models, the present research shows that introducing a small difference in an attribute that previously was identical across objects can increase perceived similarity between those objects. We propose an explanation based on the idea that small differences draw more attention than identical attributes do and that people's perceptions of similarity involve averaging attributes that are salient. We provide evidence that introducing small differences between objects increases perceived similarity. We also show that an increase in similarity decreases the difficulty of choice and the likelihood that a choice will be deferred.

Keywords

similarity, decision making, judgment, choice difficulty

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A question fundamental to many psychological theories is how people assess similarity among objects (Dhar & Sherman, 1996; Medin, Goldstone, & Gentner, 1990). Although many models of similarity judgments have been proposed (Medin, Goldstone, & Gentner, 1993), these models can largely be divided into two types: spatial models and feature-matching models (Larkey & Markman, 2005). Spatial models (e.g., Shepard, 1962) represent each object as a point in metric space; the distance between objects reflects the similarity between them. Feature-matching models (e.g., Tversky, 1977) characterize each object by a set of features; the number of common and distinctive features determines the degree of similarity between objects. In both types of models, introducing a difference between objects should not increase perceived similarity.

In contrast, we propose that introducing a small difference in an otherwise identical attribute can increase perceived similarity. Our proposition is based on two ideas. First, an attribute is more likely to be ignored when it is identical across objects than when it differs across objects. For example, when people judge the similarity between two European countries, the fact that they are both in Europe is ignored unless the context includes non-European countries (Tversky, 1977; see also Medin & Goldstone, 1995). Similarly, Medin et al. (1993) showed that when people compare objects, features that do not vary across those objects may not be considered. This may be especially true in a choice context, because common features provide no basis for choosing (Dhar & Sherman, 1996). Second, overall similarity is assessed by averaging perceived similarity across attributes, in a process consistent with a contingent averaging model of similarity judgments (e.g., Anderson, 1965).

Taken together, these two ideas imply that similarity may be based on an average of mostly distinctive features. For example, consider a choice between two different flavors of cereals. Suppose that the prices of the cereals are identical in one situation but slightly different in another. The prices will be less likely to be attended to when they are identical than when they differ. Consequently, similarity in flavors will likely be the only input to overall perceived similarity when the prices are identical, but similarity in flavors and similarity in prices will be averaged when the prices differ slightly. The two-attribute judgment can result in greater perceived similarity than the single-attribute judgment because the second attribute differs so little between the two cereals.

This *similarity effect* has consequences for choice. Recent research suggests that people can experience less difficulty in making a choice when options are more similar. Decision making entails not just choosing a favored option but also rejecting its alternatives, and rejecting alternatives often elicits counterfactual thinking and anticipated regret. When

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the option not chosen is similar to the one that is chosen, people may experience less anticipated regret and less difficulty in choosing because the counterfactuals are not very different from the actual outcome of the choice (Sagi & Friedland, 2007). On the basis of this link between choice difficulty and similarity, we propose that introducing a small difference on an otherwise identical attribute will reduce choice difficulty by increasing the perceived similarity of the available options.

Difficulty in choosing has been shown to cause people to defer choices altogether (Dhar, 1996, 1997). For example, when people face difficult trade-offs, they are likely to defer making a choice (Dhar & Simonson, 2003). Therefore, we predicted that when an attribute that was identical among options in one choice set was varied across options in another choice set, people presented with the latter choice set would be less likely to defer their choice than people presented with the former choice set.

In sum, our main hypothesis was that, contrary to existing models of similarity, small differences can increase perceived similarity. One consequence of such increased similarity between choice alternatives is that it can reduce choice difficulty and increase willingness to choose. We report four studies that tested our hypotheses.

Study 1: Introducing Small Differences Can Increase Perceived Similarity

In Study 1, we tested whether small price differences can increase perceived similarity between choice alternatives. We varied price in the context of a choice between ordinary items because in this situation, price is generally quite salient and may be difficult to ignore even if it is identical across alternatives.

Method

Ninety-three university students (57% women, 43% men) participated in a survey session for monetary compensation. Participants imagined that they went to a store to buy some tea and were presented with two options: lemon ginger tea or citrus cinnamon tea. Participants saw an image, ingredients, benefits, and the price of each tea. For one third of the participants, the prices of the two options were the same ($3.79; same-price condition). For the remaining participants, the prices were slightly different ($3.68 and $3.79, or vice versa; different-price condition; one third of the total number of participants was assigned to each version of this condition). All participants were asked to choose one option and to indicate how similar the options were (scale ranging from 1, *not at all*, to 9, *very*).

Results and discussion

The choice share of lemon ginger tea did not differ between the two versions of the different-price condition (48% vs. 42%), $\chi^2(1, N = 62) < 1$; perceived similarity of the two teas also did not differ between these conditions (6.42 vs. 6.03), $t(59) < 1$. Therefore, we combined the data in the different-price conditions for the following analysis.

Supporting our hypothesis, analyses revealed that participants in the same-price condition indicated that the options were less similar, $M = 4.94$, than participants in the different-price conditions indicated they were, $M = 6.23$, $t(90) = 2.79$, $p < .01$, $\eta^2 = .079$. Choice shares did not differ across the conditions (42% vs. 45%), $\chi^2(1, N = 93) < 1$.

We replicated this pattern of results with other objects. For example, participants at a Korean university were asked to choose between two cereal options (wheat and oats vs. brown rice and corn). The two cereals were perceived to be less similar when their prices were the same (₩3,700; approximately $4) than when their prices were slightly different (₩3,900 and ₩3,700, or vice versa; same-price condition: $M = 5.03$, different-price condition: $M = 6.01$), $t(119) = 2.59$, $p < .05$, $\eta^2 = .053$. Another group of participants, who chose between restaurant entrées (tomato seafood vs. chili shrimp), also rated the two dishes as less similar when the prices were the same ($17.00) than when they were slightly different ($17.00 and $18.00, or vice versa; same-price condition: $M = 3.73$; different-price condition: $M = 5.60$), $t(34) = 2.69$, $p < .05$, $\eta^2 = .175$.

Study 2: Drawing Attention to Identical Attributes

In Study 2, we tested our proposed mechanism for the similarity effect observed in Study 1. We posited that introducing small differences increases perceived similarity because shared features receive less attention than distinctive features and do not influence similarity judgments. However, if attention is drawn to shared features, those features should be incorporated into similarity judgments, and perceived similarity should increase. To test this idea, we used a within-subjects design in which a feature was identical across options in one choice but varied across options in another choice, to draw attention to that feature (Grice, 1966).

Method

Ninety-four university students (56% women, 44% men) participated in a survey session for monetary compensation. Participants were presented with five entrées on a restaurant menu (salmon, chicken, tuna, pork ribs, and shrimp) and asked to choose among them. Prices were either all the same ($23.95; same-price condition) or all different ($23.25, $23.50, $23.95, $24.20, and $24.45; different-price condition). In the different-price condition, the five prices were randomly assigned to the entrées. All participants chose one entrée and rated how similar the five options were (scale ranging from 1, *not at all*, to 9, *very similar*).

After completing this task, participants took part in an ostensibly unrelated study. They were presented with six

cereals that had either identical prices ($4.23; same-price condition) or slightly different prices ($3.83, $3.89, $3.96, $4.07, $4.15, and $4.23; different-price condition). Participants chose one option from the six cereals and rated how similar the six options were (scale ranging from 1, *not at all*, to 9, *very similar*). Participants who had chosen among differently priced entrées were assigned to choose among identically priced cereals, and vice versa. Although identical prices would not normally draw attention, we reasoned that participants who saw varying prices in the first choice (entrées) would be primed to think about price and that their attention would be drawn to prices in the second choice (cereals), even if all options had the same price. Therefore, we expected that everyone would attend to price in the second choice, either because the prices varied in the second choice or because the prices had varied in the first choice. In the first choice, however, only participants who were told that the options differed in price were expected to attend to price.

Results and discussion

Results for the first choice replicated our previous finding: Participants in the same-price condition perceived the five entrées as less similar ($M = 2.40$) than did participants in the different-price condition ($M = 3.33$), $t(92) = -2.71$, $p < .01$, $\eta^2 = .074$. However, the reverse was true for the second choice: Similarity ratings were higher among participants told that the cereals had identical prices ($M = 5.43$) than among participants told that the cereals had different prices ($M = 4.09$), $t(92) = 3.19$, $p < .01$, $\eta^2 = .100$. These results support the notion that attributes that are identical across alternatives are likely to be ignored. However, when attention is drawn to these attributes, they can enter into similarity judgments and increase perceived similarity.

Study 3: Price Differences Affect Choice Difficulty Through Perceived Similarity

Our next study tested the consequences of this similarity effect for choice. Research has shown that similar options can be seen as more substitutable for one another and may therefore elicit less anticipated regret and less choice difficulty (Sagi & Friedland, 2007). In this study, we measured substitutability and choice difficulty to examine whether the similarity effect observed in Study 1 indeed makes choice options more substitutable and choices less difficult.

Method

Forty-eight university students (38% women, 62% men) were recruited around campus for a short survey. Participants were assigned to one of two conditions and presented with six cereal options (Honey Bunches of Oats, Multigrain, Organic Promise Strawberry Fields, Organic Pumpkin Granola, Raisin Bran Crunch, and Cinnamon Pecan). In the same-price condition, prices for all the cereals were the same ($4.23); in the different-price condition, the following six prices were randomly matched to the six cereals: $3.83, $3.89, $3.96, $4.07, $4.15, and $4.23. Participants chose one cereal. They then indicated how difficult and how easy it was to make the choice and how substitutable the options were, using 9-point scales ranging from 1 (*not at all*) to 9 (*very*).

Results and discussion

We averaged the ratings of choice difficulty and ease (reverse-scored) to obtain a single score for choice difficulty ($r = .87$). Participants in the same-price condition experienced more difficulty in choosing ($M = 4.83$) than did participants in the different-price condition ($M = 3.64$), $t(46) = 2.12$, $p < .05$, $\eta^2 = .089$. They also perceived the options to be less substitutable (same-price condition: $M = 5.39$; different-price condition: $M = 6.64$), $t(46) = 2.13$, $p < .05$, $\eta^2 = .090$. Further, changes in perceived substitutability mediated the effect of price differences on choice difficulty, 95% bootstrapped confidence interval = [0.015, 1.096] (Preacher & Hayes, 2004).

Study 4: Consequences for Choice Deferral in Real Choices

In Studies 1 through 3, all participants were forced to make a choice. If an option to defer is available, however, the difficulty experienced during the choice process can affect whether or not the choice is made. Prior research has shown that greater choice difficulty leads to greater likelihood of choice deferral (e.g., Dhar, 1996, 1997). Because slight differences in price reduced choice difficulty in Study 3, we anticipated that such differences will decrease the tendency to defer choice. Study 4 examined an actual choice that included the option to defer. We predicted that making prices slightly different would reduce the frequency with which participants deferred a choice.

Method

Study 4 was conducted in a psychology laboratory in a Korean university. Seventy-eight students (51% women, 49% men) were given ₩1,000 (approximately $1) that they could use to purchase one of two types of gum, which had either the same price (₩630; same-price condition) or slightly different prices (₩620 and ₩640, or vice versa; different-price condition). Participants could also choose to buy neither gum, keeping all their money.

Results and discussion

The percentage of participants who chose to purchase one of the gums did not differ significantly between the two versions of the different-price condition (84% vs. 70%), $\chi^2(1, N = 39) = 1.54$, n.s., so we collapsed them for the following analysis.

As predicted, participants were more likely to purchase one of the options when the prices differed (77% of participants) than when the prices were the same (46% of participants), $\chi^2(1, N = 78) = 7.80$, $p < .01$, $\varphi = .316$.

General Discussion

Introducing a small difference in an otherwise identical attribute can increase the perceived similarity of choice alternatives. This finding stands in contrast to the idea (underlying many similarity models) that similarity always decreases with the introduction of differences. When differences are very small, the attention drawn to these differences (compared with an invariant attribute) can cause an increase in perceived similarity. This increased similarity can reduce choice difficulty and the likelihood of choice deferral. In our final study, introducing a 3% difference in price nearly doubled the incidence of purchase.

In our studies, we manipulated one attribute: price. Future research could examine the effect of introducing differences in other attributes. Previous studies have suggested that quantitative (alignable) distinctive features draw more attention than qualitative (nonalignable) distinctive features (e.g., Markman & Gentner, 1993). People tend to use quantitative attributes rather than qualitative attributes in comparisons because qualitative differences are difficult to process. Introducing small differences in qualitative attributes, such as color, might not draw attention to the same extent that introducing quantitative differences does, and might not produce the similarity effect we observed in the case of price. However, prior research has demonstrated that qualitative attributes may be processed similarly to quantitative attributes when differences are small (Herrmann, Heitmann, Morgan, Henneberg, & Landwehr, 2009). Future research could examine whether slight variations in qualitative attributes produce the similarity effects observed in the present studies, as well as whether slight variations in quantitative attributes other than price also produce these effects.

Our studies examined a similarity effect in the context of choice, when the explicit goal is to focus on differences (i.e., for the purpose of making a choice). Identical attributes generally are not an important basis for choosing. It would be interesting to examine whether the observed similarity effect extends to nonchoice contexts, in which identical attributes might naturally attract more attention.

We found that adding differences increased perceived similarity and willingness to choose, but there may be some instances in which adding differences increases choice deferral. For example, we manipulated price differences in choice sets with six or fewer options and only a few attributes. If people are making a choice among a larger number of options, adding differences may make the choice too complex and may decrease willingness to choose (Iyengar & Lepper, 2000).

Although we examined the consequences of slight differences for choice difficulty and choice deferral, some research suggests that our similarity effect could have additional consequences. For example, Wang, Novemsky, Dhar, and Baumeister (2010) found that choices involving large trade-offs deplete executive resources more than choices involving smaller trade-offs, and result in greater self-regulation failure in subsequent unrelated tasks. Introducing a small difference in an otherwise identical attribute might reduce the perceived trade-offs and reduce depletion of executive resources, and increase subsequent self-regulation. For example, if people perceive a choice between identically priced options as involving larger trade-offs than a choice between options with slightly different prices, they may expend more executive resources on the choice in the former case and might be less able to choose a virtue over a vice after making such a choice. Our preliminary study supports this prediction.

Small differences across choice options may seem trivial. Indeed, we examined people's intuitions about their choices in a follow-up study and found that most people predicted that small price differences would not affect their choices and underestimated their tendency to pay attention to those differences. The present research suggests the opposite—that small differences can have a substantial impact on decision making.

Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

References

Anderson, N. H. (1965). Averaging versus adding as a stimulus-combination rule in impression formation. *Journal of Experimental Psychology*, *70*, 394–400.

Dhar, R. (1996). The effect of decision strategy on the decision to defer choice. *Journal of Behavioral Decision Making*, *9*, 265–281.

Dhar, R. (1997). Consumer preference for a no-choice option. *Journal of Consumer Research*, *24*, 215–231.

Dhar, R., & Sherman, S. J. (1996). The effect of common and unique features in consumer choice. *Journal of Consumer Research*, *23*, 193–203.

Dhar, R., & Simonson, I. (2003). The effect of forced choice on choice. *Journal of Marketing Research*, *40*, 146–160.

Grice, G. R. (1966). Dependence of empirical laws upon the source of experimental variation. *Psychological Bulletin*, *66*, 488–498.

Herrmann, A., Heitmann, M., Morgan, R., Henneberg, S. C., & Landwehr, J. (2009). Consumer decision making and variety of offerings: The effect of attribute alignability. *Psychology & Marketing*, *26*, 333–358.

Iyengar, S. S., & Lepper, M. R. (2000). When choice is demotivating: Can one desire too much of a good thing? *Journal of Personality and Social Psychology*, *79*, 995–1006.

Larkey, L. B., & Markman, A. B. (2005). Processes of similarity judgment. *Cognitive Science*, *29*, 1061–1076.

Markman, A. B., & Gentner, D. (1993). Splitting the differences: A structural alignment view of similarity. *Journal of Memory and Language*, *32*, 517–535.

Medin, D. L., & Goldstone, R. L. (1995). The predicates of similarity. In C. Cacciari (Ed.), *Similarity in language, thought and perception* (pp. 83–110). Brussels, Belgium: BREPOL.

Medin, D. L., Goldstone, R. L., & Gentner, D. (1990). Similarity involving attributes and relations: Judgments of similarity and difference are not inverses. *Psychological Science*, *1*, 64–69.

Medin, D. L., Goldstone, R. L., & Gentner, D. (1993). Respects for similarity. *Psychological Review*, *100*, 254–278.

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers*, *36*, 717–731.

Sagi, A., & Friedland, N. (2007). The cost of richness: The effect of the size and diversity of decision sets on post-decision regret. *Journal of Personality and Social Psychology*, *93*, 515–524.

Shepard, R. N. (1962). The analysis of proximities: Multidimensional scaling with an unknown distance function: Part I. *Psychometrika*, *27*, 125–140.

Tversky, A. (1977). Features of similarity. *Psychological Review*, *84*, 327–352.

Wang, J., Novemsky, N., Dhar, R., & Baumeister, R. F. (2010). Trade-offs and depletion in choice. *Journal of Marketing Research*, *47*, 910–919.